

AVIATION WEEK

NOVEMBER 1, 1948

A MCGRAW-HILL PUBLICATION



Mr. Paul Besson
Operations Manager
North American Division
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New Injection

THE PRODUCTS illustrated on this page are typical of a wide range of products which are manufactured by the Avtron Accessories Division of our company in "Cleveland."

This division has specialized for years in the engineering and production of fuel systems for jet and piston engine military planes, as well as commercial and private aircraft of all types. It also designs and has associated equipment for the production of the new rotary compressor assemblies of steel, aluminum or magnesium, used for supercharging aircraft engines.

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Large Plant Division Products, for Goodrich—shown in this illustration are Avtron Accessories Division



Photo courtesy Goodrich Aircraft

How to make cleaning dirt-cheap

A conventional airplane carpet, like the one in the auto above, soaks up stains, traps dirt, gets greasy and cleaning it is a difficult, expensive job. The carpet has to be removed and dry cleaned. Extra carpet wear becomes a headache for pilots and owners.

To B. F. Goodrich engineers, all this bother and expense looked like a problem that Avtron—their new flexible synthetic material—might solve. They developed special Avtron cleaning and backed it with fabric and sponge rubber, producing the Avtron Flight Rag. This American Airlines' picture, which shows an Avtron Flight Rag

(under seat) and a conventional carpet side by side, tells the story. Things that are spilled on an Avtron Flight Rag don't soak in, can be easily wiped up. Thorough cleaning can be done with soap and water, or soap attached solvent, without removing the Avtron rag.

Cheap, quick cleaning wasn't the only thing that B. F. Goodrich engineers had in mind when they developed the Avtron Flight Rag. These rags last far longer than conventional carpets. They're easy to install, don't wrinkle. The foam-proof sponge rubber backing provides delivery comfort. The expensive

looking grime and glumes colors add new beauty to any cabin.

Avtron is an ideal material for almost every interior finishing job. Many airlines use it for wall paneling, seat rails, baggage racks, ball-beds and other places.

For help with your decorating problems and for information on Avtron applications, colors, prices and prices, write to The B. F. Goodrich Company, Avtron Sales Division, Akron, Ohio.

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MEMORANDUM FOR THE RECORD: This memorandum is being prepared for the information of the Board of Directors and the Executive Committee of Phillips Petroleum Company. It contains a summary of the results of the investigation conducted by the Engineering Department of Phillips Petroleum Company, Tulsa, Oklahoma, on the subject of the failure of the No. 1 engine of the Phillips 66 aircraft engine during the flight of the Phillips 66 aircraft on October 28, 1948. The investigation was conducted by the Engineering Department of Phillips Petroleum Company, Tulsa, Oklahoma, and the results are summarized in this memorandum. The investigation was conducted by the Engineering Department of Phillips Petroleum Company, Tulsa, Oklahoma, and the results are summarized in this memorandum. The investigation was conducted by the Engineering Department of Phillips Petroleum Company, Tulsa, Oklahoma, and the results are summarized in this memorandum.

Stamp of Approval



In very early times, pieces of gold were stamped with their correct weight and the seal of the king. When a person recognized the royal stamp, he was certain of the honest worth of the piece of gold. Thus, many, many years ago, the "stamp of approval" had its origin.



Today, also, the "stamp of approval" on any product has a definite...of intangible...value. It is a significant fact that many of the leading commercial air lines have placed their "stamp of approval" on Phillips 66 aviation products. Yes, their use of Phillips 66 high-octane aviation fuel and Phillips 66 aviation lubricants is your assurance of the reliability and worth of these products.

Whenever you buy gasoline or motor oil for your plane, remember this "stamp of approval" and ask for... Phillips 66. The Aviation Department, Phillips Petroleum Co., Bartlesville, Okla.



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Navy Backs Ingalls

Even as a period in airline racket is still developing in the name of how David Ingalls, former assistant secretary of Navy for air, installed as an adviser of defense under a Dewey administration. Ingalls is being aggressively pushed by Navy supporters, who think under his or some other "good Navy man" get the top job, the Navy will rapidly give way to the Air Force as superpower in the national defense setup. The falling point of Navy men to Dewey adviser Appointment of Ingalls, a career of GOP Sen Robert Taft of Ohio, would smooth relations between the New York Governor and Taft, who promises to be the chief GOP challenger of Dewey against an Clifford BUE.

Ingalls is now vice president of Pan American Airways, and assistant sponsor of the "defense improvement" program. As secretary of defense, Ingalls would have a big voice as the main, since overseas air transport is regarded as an area of national defense.

Kitty Hawk Returns

End of a two decade mission in the Science Museum in England (except for a wartime interlude in a bomb-blasted) came on May 5 for the world's first carrier plane, the Wright Brothers Kitty Hawk biplane of 1903. On that date the plane sits on the Miramar in the U. S., owned by Dr. H. Shaw, director of the Science Museum.

Dr. Shaw will advise Smithsonian Institution associates specialists on re-assembling the biplane which becomes the No. 1 airplane exhibit at the Institution beginning with a celebration on the 45th anniversary of the plane's first flight Dec. 17. Later it will be the central figure in the new National Air Museum when that is built.

Flashed for the plane has finally been approved by members of the Wright estate who rejected several earlier suggestions as inadequate. Smithsonian already has been agreed to give the old biplane still with direction National Museum exhibit, because of some in concrete reconstructed framework which tend to keep alive the old Smithsonian-Wright biplane controversy over "the first three minutes of flight."

The controversy was pacifically ended five years ago, when the Smithsonian published a retraction of its earlier statements. The Kitty Hawk plane will be on loan from the Wright

NEWS SIDELIGHTS

Roll Your Own

Airline manufacturers' escape to civil aviation and steel manufacturers into the "tapered sheet" business are discussed in this department. The tapered steel sheets used in the North American F85A are being called on North American's two engine equipment, after manufacturers are planning to do the same thing.

Nether, Aluminum Co. of America and U. S. Steel Corp. are situated in the design and construction of rolling equipment costing several million dollars when the aircraft designed for tapered sheets is not expected to reach more than a ton a day for at least several years. With U. S. Steel producing 100,000 tons of steel per day and ALCOA producing 1000 tons of aluminum per day, neither would be expected to do a single ton one way or the other that required such special equipment.

In addition, short runs, for quiet design changes and exceptionally close tolerances in other requirements to large rolling mills go out that they may need. For the next few years, at least, this is one headache the airline industry can't pass up to control supplies.

estate pending final settlement. Eventually the aircraft is to become a permanent gift under carefully stipulated conditions.

Drive for Integration

Transportation Association of America, which has introduced a national "law", has set a target date of January, 1958, for submitting a comprehensive transportation legislative program to Congress, moving and consolidating all existing transport laws. This year the association set up a nationwide organization to seek out the program. Its roster of consultants includes hundreds of top executives of the country's leading industrial and financial houses.

Sponsoring of the organization is by \$2,500,000 a year over president, Donald Conn, who handles lobbying activities. Over the past several years, TAA's activities have been limited to planning

for reorganization of transportation membership before Congressional action and behind the secret Aviation Industry relations the department until 1958 of what will probably be TAA's all-out push for integration. They are hopeful that by then Congress will already have enacted comprehensive aviation legislation modernizing the 1938 CAA Act.

Only an transport executive working with TAA is W. A. Patterson, president of United Airlines. He is on its executive committee.

Loosed C-54s

Acting of top defense officials in authorizing Gen. Lucius D. Clay, U. S. military governor for Germany, to draw in an additional 66 C-54s for the Berlin airlift may have native opposition if necessary, the Air Force can take back, acceptably upon some 40 C-54s now on hand.

Five American Airlines has 17 of the planes, American Overseas Airlines 2, TWA 2, Northwest 5, the Flying Tiger 1, United 1, Alaska Airlines 1, Embroider & Wright 1, George W. Tompkins, San Francisco, 5, Francis C. Christian, New York City 2, and George A. Feltner, Yonkers, N. J., 1 All of the C-54s are either D or G models.

Ho Hum at the Clinic

Probably a new low mark in the delirium was reached during some sessions of the recent 44th National Aviation Clinic at Detroit. At one occasion there was not a single response made by delegates when they were called upon to vote, either for, or against, one of the 100 or more suggested bills which were before them. Speaker pro tem Jerome Ruppel, of Capital Airlines, recalled his former years in Congress as unable stations, and thanked accordingly with his smile. The delirium returned in the next.

He put the question again, local and idea. There was some scattered yes, and no responses. Ruppel declared the most modest and added in his most polished manner "The speaker compliments the delegates on their voting. He hopes they will continue to vote, on one side or the other." Lethargy of the delegates and the problem was blamed for the fact that most good controversial issues such as the six-city question, died in the color committee, and that too many issues were presented in separate bills, rather than consolidated.

Do you know the passenger capacities of these transports?

(EACH REPRESENTS A MILESTONE IN AVIATION HISTORY)



1. The first commercial airplane was the Blériot XI. On January 1, 1914, it carried a two-hour west trip over the St. Lawrence Bay between St. Lawrence, Quebec, Canada. One lone passenger.



2. In October, 1919, commercial flight was inaugurated between Greater City, Long Island and Washington, D. C., with the Curtiss Eagle, a comparatively standard transport for its day. It carried eight passengers.



3. During the routing process the Ford Tri-Motor would carry anybody almost any place. With a speed of 345 m.p.h., it was a work horse for almost every commercial airline then operating. Fourteen passengers could ride in it. (Left to right)



4. Practically every air traveler in the world has enjoyed the luxury of the Douglas DC-3. With two engines making out a total of 2100 h.p., it flies at a dependable 180 m.p.h. It usually carries 21 passengers and a crew of three.



5. These high speed, high altitude jets, with pressurized cabins, are typical of today's transports. The 31-seat Lockheed Constellation (left) has a capacity of 64 passengers.



The 6000 h.p. Douglas DC-6 (center) has a loaded capacity of 120 passengers. The 348 h.p. jet Boeing Stearman (right) has two decks, carries upwards of 75 passengers.



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INDUSTRY OBSERVER

► U. S. Air Force is warning jet fighter pilots against a potent distraction of propellers becoming spray. During simulated gunnery runs against a B-29 formation a Republic F-44 disintegrated when it encountered the B-29 prop wash.

The pilot was killed on another similar exercise with Lockheed F-50 against B-29s. One F-50 pilot was killed over in a nose-over stall bank to the right as he crossed a gun of the bombers. When he hit the prop wash it flipped him over into a vertical loop to the left and tore all his left wing tip back and part of the wing tip. He was able to make an emergency landing in the damaged plane.

Observers who have sampled the tremendous prop wash of the B-29s six gunner groups wonder if shooting jets could do so in accurate steps as possible from the sun without screen trouble.

► Airlines report an increased number of air-aid instrument approaches at Newark since the removal of an experimental scale of instrument field rates. Low-level approach lights from the field The Skyway lights are now at Ansonia, Conn., for construction of the test program begun at Newark.

► Floyd Collins, chairman of Atlas Corp., hopes to increase \$57,000,000 for the Convair Equipment Corp. to handle its initial 100 transport planes. Collins is talking with the Reconstruction Finance Corp. about a \$40,000,000 loan for the equipment subsidiary of Convair.

► Cal Aero Technical Institute has completed all tests on a Japanese HA-51 aircraft reciprocating engine under Air Force contract. The double-row radial engine contains 22 cylinders and an integral cooling fan. Results of the tests indicate that the engine was basically a Pratt & Whitney design with some Wright horizontal and active injection features. Castings were of poor quality and mechanical surface tolerances were far from U. S. standards.

► Despite absence of a prototype, Northrop Aircraft is going ahead with certification of its tri-motor Pioneer. The first airplane was delivered in a crash last March and the new and gentle version B-10 will not be ready for flight into early next spring. "Northrop is confident of commercial sales for the quick takeoff, slow-landing "both fighters," which can also be used for border passage service and dozens of other flying jobs.

► Although neither Air Force nor Northrop investigators expect an aerial determination of the cause of the Northwest 704-49 engine flying. Wing breaker took last June, occurrence of both items is that structural failure of a wing tip caused loss of control. "While loss of an airplane on conventional aircraft does not necessarily cause loss of control, loss of the elevator and tip rudder normally does a tailless aircraft destroys all control characteristics, lateral and longitudinal."

Cause of the failure cannot be determined through one of the missions of the flight during the period was maximum control deflection tests, requiring control control at speed. Emergency speed combined with maximum elevator deflection might have overloaded the tip section.

► Accumulated commercial records and Air Force orders will keep Lockheed Constellation production line in operation into December, 1949. Present production of two a month probably will not be cut to one a month upon completion of the USAF order.

► Lockheed's supposedly half-bath prepared for a super new type Constellation has developed major leaks and has more Douglas DC-6A type transport designs in a competitive bid, wondering if Lockheed is serious or bluffing. Probability is that Lockheed is not bluffing in telling manufacturers that by substituting component engines and lengthening the fuselage on the Constellation 15 ft, the transport's speed can be boosted 13 m.p.h. with a 9 percent fuel saving, and cargo capacity can be increased by 111 over 1000 cubic feet. Lockheed designers indicate to buyer prospects that the plane could be ready for production within two years. Press have not yet entered discussion.

NEWS DIGEST

DOMESTIC

Northwest Airlines had returned to its Boeing 747 in its service by early last week and hoped to have the remaining 18 back in operation by Nov. 1. Lt. Gen. Curtis E. LeMay assumed command of the Strategic Air Command, Andrews Air Base, Md., succeeding Gen. George Kenney, who took over the Air University, Maxwell Base, Ala.

Eastern Air Lines set a new time record between Newark, N. J., and Washington, D. C., when a Constellation, refueled by hot winds, made the flight in 34 min., cutting 15 min. from the old mark. Average speed was 370 m.p.h., top speed 400 m.p.h. An Air Force F-50 two year ago covered the distance in 29 min.

Twenty-seven Navy B-29s will join Air Force aircraft on the Pacific Berlin route of the south, in part of the Trans-Atlantic route, following 60 additional aircraft. Plans will come from the Pacific Division of MATS.

Robert F. Patterson, former Secretary of War, in a speech in New York urged small subsidiaries of the "Ford" plan for themselves in the commercial program. "Otherwise, he warned, some of their existing markets may be captured."

FINANCIAL

General Electric Co. reports net income, after \$60 million in income taxes, of \$53,895,479 for nine months ended Sept. 30. Sales were \$1,117,957,072. Earnings equal \$2.91 per share on 23,845,927 shares outstanding. Next nine months period of last year was \$62,506,626, an 18% increase. 1921, 221,142, or an increase equal to \$1.17 per share.

Western Mfg. Co. reported to Securities and Exchange Commission sales of \$204,835 for three months ended Sept. 30. While less than the \$1,260,655 in sales in the like quarter of last year, comparable this year are being carried out at a profit, according to President Henry P. Nolan.

FOREIGN

Britain's light helicopter, Cierva Scouter (American Sikorski, HO-11), made its first flight.

New Zealand National Airways Corp. transport carrying 13 persons was abandoned 45 hours after taking off from Wellington.

Australia is negotiating for purchase of 25 Chance Super Ace, four-place British-made lightplane. Two planes, primarily for reconnaissance, already have been shipped to Buenos Aires.

Door Opened to Export of Jet Fighters

U. S. lifts ban on sales to Latin America; Western Europe may become market.

By Robert R. Elton

Reversal of the military aircraft export ban on a slowly increasing scale is foreshadowed by representatives of the Western European Union defense aid loan and lifting of the U. S. State Dept. ban on export of jet fighter types to Latin America.

Among significant developments last week:

- Release for export to Latin America of the Republic Thunderbolt (F-54) and the Lockheed Shooting Star (F-80). Both are the latest jet fighter types in service with U. S. Air Force squadrons.
- Also released for Latin American export were the North American two Mustang (F-51) long-range fighter and the Fairchild Pacer (C-51) twin engine transport.
- Negotiations between Fordham Engine and Airplane Co. and the Royal Canadian Air Force for production of the Pacer in Canada by a Canadian company, probably Canadian Ltd.

Canadian-patterned Pacer would be used by the RCAP, Royal Air Force, and Royal Australian Air Force.

• Indications from Britain that substitution with U. S. aid will be engaged in expanding British jet fighter production to meet the needs of Western Union powers. France, now without aid and equipment will be needed according to British sources.

Opening the Latin America export door to U. S. jet planes is not expected to produce any immediate business. South American countries are now equipped with obsolete types of U. S. propeller driven fighters bought at bargain counter sales from the War Assets Administration. Only the Argentine has been a big buyer of foreign military planes recently. This country now has about \$58,000,000 worth of military planes on order at Boston including 160 Gloster Meteor, the latest jet fighter.

Both Lockheed and Republic were in competition for the Argentine order.

that went to Gloster. Then the U. S. export has prevented any effective sales campaign. Now the door is open to U. S. British competitors in the Argentine as well as the rest of South America.

• **Brazil Must Proceed**—The most promising markets now appear to be Brazil, which leans heavily on U. S. military aviation aid, and its self cooperation with the Argentine and Venezuela, which has only a mild interest in a military air force but a large favorable dollar balance. State Dept. and it filed the jet export has an understanding that Lockheed and Republic should carry out their previously planned sales campaign in South America. Both Republic and Lockheed are in a position to fill any Latin American order out of increased production without curtailing their current USAF commitments. The GE Alamo 115 jet engine which powers the F-54 has not yet been released for export. Air Force officials indicated that it would be released by the time any Latin American orders were ready for delivery.

Brazil and North America do not look for an export business on the C-57 and F-51. Both planes have gone out of production. Not even usable orders from Latin America would absorb the cost of reestablishing production lines. However, the Fairchild RC-52 negotiable are well understood, for C-52 production in Canada under a licensing agreement with Fairchild. According to these plans Fairchild would sell the designated Canadian firm, probably Canadian, the drawings, tool and production equipment it still retains on the C-51. Required design exchange is one of the major points still at issue.

• **State Dept. Approval**—All sales of military planes to Latin America must be approved individually by both State Dept. and Air Force. They are also subject to the usual export licensing provisions. State Dept. considered it would allow exports only at proportion to a country's own self requirements, and would probably bar shipments to countries such as Nicaragua and Guatemala, which are now receiving financial aid. All contracts will have ample of military planes to a dual plan.

At present there are no indications that the U. S. Govt. will aid in financing

South American plane purchases. Export-Import Bank has never approved a loan for military purposes.

• **High Prices**—South American countries are likely to be surprised at the high price of jet planes. For example, the price of 49 F-51 fighters bought from WAS two years ago came to only \$515,800. Today that is just a little more than the price of a single jet fighter. South Americans, however, will get their jets at relative bargain rates since all development and casual

production costs will be absorbed by U. S. military contracts. Unit cost prices will be considerably reduced by the new foreign orders and be killed.

As details of the Western European Union defense agreement creep out of the London conference, it is apparent that the immediate aviation emphasis is on building up a strong jet fighter force with Britain supplying both planes and pilot training. Limited deliveries of Gloster Meteors have been made to Holland with France scheduled to get

some soon.

As yet the U. S. is participating in these Western Union conferences only as an observer. But there are indications that a strong program of military aid for the United States will be presented by the next Congress. The Maritime Board of the National Military Establishment is now studying the effect of a new Local Lease military program for the Western Europe in relation to current domestic military expenses, particularly the 70-Group Air Force program.



XP5Y-1: Latest Navy Flying Boat

New high-performance craft compares favorably with land-based bombers; slated to fly early next year.

Convair XP5Y-1 (Aviation News, June 2, 1947) is the first of the Navy's new family of high-performance flying boats based on a variable geometry design that possesses performance comparable to land-based bombers.

The outcrop-powered craft is capable of performing the same type of combat job as the Boeing B-34, current standard medium bomber, and has the additional advantage of operating from water runways any place in the world. Prototype has been completed at Convair's San Diego plant and is scheduled to fly first in 1948.

• **Two-Ton Bomb Load**—The P5Y can carry a 10-ton bomb load for 1600 miles at 210 mph at 25,000 ft. performance superior to the Lockheed P-61 Neptune, the standard Navy land-based bomber, and the Boeing B-29, standard Air Force land-based light bomber. The P5Y has a top speed of 362 mph at 25,000 ft.

and 573 mph at sea level. It can climb from altitude at the rate of 3000 ft. per min.

The engine are five Allison T-40 turboprop units developing 3350 hp plus 508 hp thrust at takeoff and rated at 4100 hp plus the same extra thrust. This installation power is absorbed by 11 ft. wingspan and duct-mounted propeller assemblies mounted in streamlined nacelles with jet nozzles at the rear.

• **Boat Spaces**—The 73-foot flying boat has a span of 196 ft. and a 130-ft. long. It stands 45 ft. high to the top of the fuselage. Normal operating weight is 57 tons. The aircraft normally carries 9380 gal. of fuel.

Major feature of the P5Y, and the one that provides its extraordinary high performance, is that use of a high fuselage with tail which is long and narrow. This hull form reduces drag and

decreases drag while not requiring water leveling characteristics. It features a sloping nose which induces water surface waves, thereby generating lift on the steep nose quickly and reducing "porpoising" tendencies on landing.

• **Artillery Yokeless**—Intruder design of the P5Y has stressed an "artillery" attitude which will permit the craft to remain on the surface at sea for periods as long as several weeks. A usual gas turbine engine, conventional in operation, provides air pressure for the operation of hydraulic control systems to operate lights, landing and engine controls and engine starting. Special lightweight air devices, such have been developed for the new flying boat.

Several versions of the P5Y will be available, including long range heavy bombardment, anti-submarine patrol, cargo and photo reconnaissance, long or high transport. The prototype will be equipped for day and night air search and reconnaissance service.

• **Powered Model**—Design of the P5Y is based on a series of powered flying models one of the first projects on



"BIG C" GETS BIG PUSH

Six JATO units mounted in upper section of wing of Lockheed's Convair-type jet flying transport on initial phase of 6000 thrust lb. by 15 units, and not in excess of 25 pound at 15000 ft. Air Force received JATO models have been used for all Convair transport weight up to and beyond development

of 15,000 lb. maximum gross weight. Plans now being doing test at Lockheed Air Terminal to make planes tested the standard runway completely for several minutes. This device is considered one of JATO may be used by other Convair JATO dual use aircraft development.

which this new method has been used extensively. The models included a static model mounted on an airfield taxiway at high speeds to provide lift, drag and parasite drag and a dynamically similar model used to estimate water tunnel test loading both. The models were powered by small electric motors and weighed in approximately a third of the mass distribution of the full-scale aircraft.

Clinic Outlook

NAA considers expansion to international status after Detroit meet.

By Alexander Metherley

Detroit—A Western Hemisphere Aviation Clinic which may be held in a southern city next year, with delegates from 16 North and South American nations invited to participate, was being considered by NAA officials following the close loss of the South American Aviation Clinic.

Analysis of the South Clinic in retrospect, indicates that Clinic procedures in ready for a "shot in the arm," such as a major change to international status, if the various branches of U.S. aviation are to be expected to participate in another such future meeting.

■ **One Airline President**—Top-level administrative officials, however, whose attendance would enable Clinic assemblies significant to their personal participation, was only sparsely represented at the South Clinic by one airline president, and a few other airline executives. Total attendance was similar to that in previous years.

Fact that working time of the Clinic was distributed from last year's schedule yet virtually the same quantity of bills was introduced on the floor, dominated the time available for discussion on any one measure. As a result, important legislation was seldom introduced with a minimum of consideration on the floor. Quantity of bills seeking improvement of personal aircraft were disproportionately to few. Relative importance in the legislative process and occupied too large a proportion of the Clinic's total time.

■ **Proclamation Policy**—One of the most significant bills of policy adopted by the delegates present was the new International policy on aviation patents as related to aviation procurement. In fact, this policy would provide that the Government beneficiary would require no license to investigate or develop an article purchased or otherwise procured on contracts involving no research or development. Research and development ac-

Discrepancies Noted

Comparison of Navy and Air Force requests of what happened at Ford (Hawthorn) on Dec. 7, 1941 shows discrepancy between the report of Rear Adm. E. A. Crane of the second South Atlantic Group, and the Air Force official record. Crane said "not a single B-17 plane was shot down by U.S. aircraft." Chapter 6 of the official history, AAF in World War II, says AAF planes that shot down two B-17 planes on December 7, 1941 were claimed but not confirmed at Ford Beach.

Adm. Crane said the U.S. had 115 B-17s short-based planes at Ford Beach. The Air Force official report says there were 231 AAF planes based in Hawaii plus 100 Navy aircraft based in the Ohio area.

A check in Washington on the official status of the second of the Crane bill, indicated that the bill had been approved for approval at the Navy Department, and had been returned to the Admiral for delivery to the House. The bill, as developed had been given

rights would not provide for acquiring rights to any other company inventions issued to private before effective date of contract. Further, the bill contained no extrajurisdictional license to govern, and other rights on an aviation arising solely research or development contracts in the company's control, limit a firm's ability to sue for such contracts. The bill would also require the inventor to develop under such contracts which are not in the manufacturer's normal line of business shall be subject to negotiation with the government before patenting contracts.

Possible to the bill and will be necessary for such a policy to be put in force in order to provide incentive for extrajurisdictional contracts to continue as military aviation contractors and to encourage new companies to enter this facilities as sources of supply for military needs.

■ **South Controversy**—Clique delegates smoothed down a controversy which flared in the early part of the session over proposed Air Force and Navy ship requirements (Aviation Week, Dec. 15 issue) by finally adopting two bills covering both Air Force and Navy requests.

In so doing they ignored four projects of Jack Cochran, wartime leader of the West, and Riva Dodge, a diplomat, and the United States Defense League, that the Navy program was necessary acquisition of Air Force ships, and upheld Rear Adm. E. A. Crane, in

his plea for full use of Navy assets and their places as an important and possibly decisive factor in future operations.

■ **East Endorsement**—Much of the Clinic was taken up by reading and endorsing matters which aviation has long favored, and which one issue endorsement will probably not affect negatively. Favorable endorsement was given by approval of transportation law, federal aid for aviation facilities, independence of and competition between land, sea, truck and air systems, etc.

As regard the proposed delegates voted for ratification of Congressional appropriations to use up the full allotment of \$50,000,000 allocated under the original Federal Airport Act within the limits of the present volume now the fund is authorized to be spent.

■ **Pointe Bybee**—Former flying bills of policy advanced further development of light aircraft, and set up specific particular development of the light aircraft, and imposed standards, and imposed variables.

Crane recommended that students enrolled in aviation technical schools be determined to do flight long enough to complete their course of training, after it was pointed out that despite demands for flight mechanic school students, enrollment was falling off due to the number of students who have failed to meet standards as being passed to high school students for similar educational reasons.

■ **Flight on Airport**—A Kim Suter of Memphis, Tenn., of the Air Club, made use of the platform at Detroit to play strongly in his speech about the proposed international airport at Detroit, and his flight of 110 or 40 aircraft in the future. Detroit is the present Wilbur Ryan airport terminal which across the city.

NMB Switch Possible

Downy, if elected, won't have to wait long to verify the three-member National Medicine Board from a Democratic to a Republican majority. The NMB handles airline labor disputes and represents the airlines. Fred J. Douglas, a Democrat, expires Jan. 31. Judge Douglas already is putting the word around that he will not be a candidate for reappointment to another three-year term. He has served since July, 1944.

The law requires that not more than two of the three members be from the same political party. The Republican majority is formed by G. O. H. H., whose term runs until Jan. 31, 1950. The other Democratic member is John T. Scott, whose term is scheduled to expire a year later.

DC-3 Sales Boom

Prices zoom on second-hand market as postwar plane deliveries are slow.

The DC-3 may be an out-of-date airplane, but you would never know it from its price on the used plane market.

Delay in delivery of postwar planes, and their high prices, plus the fact that the Air Force may try to acquire DC-3s to use as liaison planes, has caused prices on new DC-3 types as high as 25 percent in six months.

The second factor—Air Force interest in DC-3s as of strong origin and probably in the form of the two-post wing DC-3C types, according to authorities on used aircraft—is the major factor in a similar upward trend of DC-3 prices. DC-4 prices, however, are unaffected. There just are no DC-4s in good condition for sale.

■ **Over \$15,000**—A low four-year War Aircraft Administration was selling DC-3 types in good condition for as low as \$15,000. This situation held in the face of the general aviation boom, and the fact that the DC-3 was obsolete and that new transports would shortly be coming from manufacturers.

This is because apparent that production of the "DC-3 replacement" was not behind schedule and that when the new planes would be delivered the price would be far above the original figure. At that point, according to Ed Lind, vice president Lockheed division of the Douglas Aircraft Company, operators began deciding they could use the DC-3 as a free form longer.

■ **New Prices**—Results that a C-47 type in such condition as to cost \$10,000 in total will be \$15,000 today will bring from \$20,000 to \$22,000. One an exceptional condition will go for a much higher price. (Any DC-6 is good condition is available would sell for about \$22,000.)

DC-3 prices are expected to continue their climb, regardless of the eventual solution of the military surplus problem. The Air Force has a lot of DC-3s that it also is true that new operators have been given in the past year in the past few weeks by recurring reports that the government is still in possession will acquire some surplus DC-3s to bolster the airlift fleet. If any substantial number of Fords are taken from the airlines, and for DC-3s of course will become available.

■ **USAF Interest**—There have been indications that the Air Force would like to get 10 to 40 DC-4s operated by the airlines, although USAF denies it has any immediate plans along this line. WAA has listed a total of 147 planes

to operators. There are reports that acquisition of some of these from the airlines has been discussed, although WAA says no.

However, it is likely that the Air Force and the airlines will come to some kind of agreement by USAF of some air carrier planes during the slack traffic winter months. This, as well as other reports of the Air Force C-54 shortage, was recently discussed at a joint USAF-airline meeting in Washington.

Aviation Officials Killed in Crash

Three of Europe's most prominent aviation executives were killed in the crash of the KLM Royal Dutch Airlines Lockheed L-9 Constellation at Norwich, Scotland.

Aboard the plane, as seen from Amsterdam to New York, were three men: Viscountess, vice president and technical managing director of KLM, and Andre E. F. MacLachlan, European sales representative of Lockheed Aircraft Corp. Also on board was Capt. K. D. Perrier, KLM pilot.

■ **KLM Official**—Viscountess died in a crash which having been one of Europe's most able technical experts. Associated with KLM since 1913, he was mainly responsible for developing KLM's maintenance system, and was in charge of all of the airline's technical, maintenance and flight operations.

MacLachlan, a British subject, had been working in London since he came to Canada.

Perrier, the best-known pilot in The Netherlands, and one of the most famous in the world, was on duty pilot of a DC-3 which he had been flying to a specially built runway near the MacRobertson Trophy Race in Los Angeles, California, in 1944.

■ **Range Out**—The crash, which killed 13 of the 48 people aboard, occurred as the plane was attempting a landing at 12:50 a. m. under a 300 ft. overcast.

According to unconfirmed reports, the 13-8 was in a steep climb for some and at the field and the radio tower was not functioning at the time. The CCA was being operated by a training crew which normally was on duty only but had been recalled because of the malfunctioning of the tower.

Professional information indicates that the plane made a normal GCA approach under the constant of the tower, but the pilot contacted a runway and was struck by a 20 mph wind, and proceeded to go around and use another runway. Falling up, the plane hit a high-tension wire about 120 ft off the end of the runway.

■ **Not Matched**—The impact apparently

opened a fuel tank and causing fuel to spray. The pilot could not see the wing that for fuel started and that he was pulling up. The wing which was severed sagged forward to the field and, with the runway lights out, it is possible whether the pilot could have found the field stop. The plane hit about two miles from the airport.

The high-tension wire was snapped and did not cause an electric short or break wires. During the run when the field was a military air base, it is reported that two planes struck the same wire, resulting in fatal crashes.

Review Forwarder Case

Fifteen antitrusted domestic airlines have asked U.S. Circuit Court of Appeals in Chicago to review the Civil Aeronautics Board's recent decision authorizing freight forwarders to ship air cargo in a five-year period (Aviation Week, Sept. 29). Pending the judicial review, the 15 airlines requested the court to issue the effectiveness of CAB's order.

The petition for review alleged that CAB had acted without making appropriate findings and committee (other laws of law in issuing a general exemption to the forwarding). It claimed that the airlines might be required to operate equipment on the existing air transport system a duplicating system of indirect air carriers which will compete with the direct air carrier for which he had been.

Despite the court review, CAB last week issued the first freight forwarder letter of registration to Royal Air Flight Corp., New York City. Twenty-five other airlines have had applications for letters of registration on file with the Board.

IAM Claims Leadership

The International Association of Machinists is "single-minded" in its leadership of labor organizations in the air transport industry.

As IAM report states that the independent union is now beginning with its active organizing campaign under way at five others. Membership among the airlines has risen from 2,900 in 1946 to 1945, 1946.

The report also outlined the Aviation Negotiating Committee formed by the affiliated carriers last year, asserting that groups were made "outside the additional leadership of being kept in mind with ANAC." It charged that IAM and the carriers were not specifically designated by the Civil Aeronautics Board as proper bargaining representatives in any negotiation with a single airline, its personnel granted in participating in the discussion.

Plans Set for Crash Study School

Flight Safety Foundation to teach state officials accident analysis to supplement CAB investigations.

In the most ambitious project it has tackled, Flight Safety Foundation will teach what it has learned in aircraft accident investigations.

At eight critical moments averaging one to three hours in length, state officials will learn from twelve states, Canada, Louisiana and California how to investigate aircraft accidents. When they leave, they day and some 40 classroom hours later, FBI reports to have received (1) the first group of trained sub-federal aircraft accident investigators, and (2) the first curriculum ever established for including crash investigations.

Flight Safety Foundation program (Aviation Week, July 12) took two weeks, it is believed, will justify the nonprofit organization's role in a leading an adult education. One of the biggest headaches faced by workers for safety-in-personnel being especially but less lack of information on accidents.

The New-Cad Aeronautics Board, which had undertaken, one aircraft and analyze the few personnel plane crashes state police and aviation police, writing but extremely, have too little knowledge in aircraft crash (with notable exceptions in Pennsylvania, Florida and Michigan) to be much help.

Importance of the first expedition in the of the FSF course will be a number of state agencies failed an accident an investigation. It is hoped they will be able to locate more crashes than

which. On major accidents they should be first on the scene and able to do much valuable preliminary work for CAB experts.

Importance of the second objective is that it should put on the hands of FSF trainers the material with which to school other state personnel 1500 or more to report it more effectively to a country. Second school will be held only once in a lifetime.

CAB interest—having long been plagued by budgetary troubles that prevented expansion of its own investigation staff, CAB has jumped at the chance to add a young group out of FBI's training course. In the case of instructors at Woods Hole are: William K. Anderson, director of CAB's Bureau of Safety Investigation, Jean W. Lillard, chief of safety division, Joseph O. Flatt, safety chief of CAB's first office, Louis H. Tappan, chief safety report supervisor, W. B. Kerney, chief of the aeronautics section of the bureau of safety regulation, S. W. Chang, hearing and reports division chief, and Edward E. Sherry, Jr., CAB public relations chief (who will lecture on press relations in connection with an accident).

Other experts assembled by FSF President James LeClerc and his assistant Gloria Hildebrand. Delta Sport America Airlines (the only one based outside of southern E. H. Warner, Civil Aeronautics Administration (power-

plant), George Chidwell, CAA (flight planning), Hugh B. Haven, (Cairt Unmanned, (Cairt Unmanned), C. B. Efron, (Wentworth Bureau (weather), Dr. Ludwig C. Lohsen, (Cairt Unmanned (physiology of pilots), George Tryon, (Natives) For Protection Association (fire), Col. A. D. Tuttle, (aircraft designer), (United Air Lines (investigator), and Lt. Colonel Alexander W. Winkler, U. S. Coast Guard (rescue).

Eight-hour day—To train the staff of information in the training will attend classroom and some. Monday and Tuesday afternoon until five o'clock will be spent at the airport watching demonstrations of planes, fire rescue and accident simulations. Thursday afternoon will be given over to analyzing and recording a hypothetical accident, with a focus in the evening. Friday afternoon will be a mixture of lecture and evaluation of student evidence.

Training for the entire course is FSF Leave accommodations are being arranged by Flight Safety Foundation and will run an additional \$25-\$30.

More Nonsked Under Fire

Three more unscrutinized carriers have been taken into account by the Civil Aeronautics Board for alleged violations of the non-scheduled airplane. President Air Transport, Miami Airlines and Airport Airways, all large regular operations based in Miami, probably will file their accounts by CAB's request for information this week. Action in U. S. District Court in Miami. Presidential and Miami Airlines have been active on the New York-Miami-Puerto Rico run, and Airport has operated between Miami and San Juan.



NORTHROP XF-49 SPORTS FIGHTER TANKS

Rapid pace is being set by the Northrop XF-49 all-weather fighter in the first flight tests at Eglin Air Force Base, Calif. Photo shows jet tanks installed for stability

and range tests. As in the case of August, the black jet fighter, powered by dual Allison F35 engines, is already showing impressive flight performance. It has been tested by pilot Fred Beckler, in

operation of three jet tests, maximum air force cover here stands. Shows the 350 mph take-off speed, before August XI 67 is scoring completion of Northrop flight

PRODUCTION

Canada's Role

Plants, labor, aluminum point up its importance to air rearmament.

While still tiny to U. S. or British standards, Canada's manufacturing capacity is being put to use in support of the air rearmament of the British Commonwealth and the Western European nations. And with that importance probably will come an increase in production.

Canada's establishment of British aircraft companies subsidiaries in the Dominion, plus participation of agreements under which U. S.-designed aircraft would be produced in Canada (page 12), high-light the Dominion's role. How effective that role will be is questionable. But what Canadian can't forget is that during the war, British aircraft production in Canada (page 11), 500,000 people in 5,402,301 sq. mi.) produced over aircraft per capita than any of the allied nations.

Advantages—As an aircraft producer for world needs now, Canada has several plant advantages. It has ample plant capacity in modern buildings (all major plants were constructed during the war), simple trade-in program (100,000 used cars, 100,000 used airplanes, about 10,000 employed in aircraft industry), and ample supplies of home-produced aluminum.

It has vast labor force which has been an expert familiarity with U. S. high volume assembly methods (as opposed to slow hand-assembly techniques of small European manufacturers) and in the Dominion, including with that in the U. S., but a much lower wage scale (average weekly wage of \$44.95 against \$60.00).

Present Production—Producing as an actual experience in the world aircraft manufacturing, there the Dominion is doing today has this making:

Canada Ltd.—Manufacturing a producing 27 DC-4s for British Overseas Airways Corp and four of the same planes for Canadian Pacific Airlines. At the end of 1947, this plant—which is owned by Electric Steel Co., a U. S. firm—had a backlog of \$21,700,000. Since that time this backlog has been cut down by deliveries of 15 DC-4s to Trans-Canada Airlines, but another again by the BOAC order. Canadian is the latest aircraft producer in the Dominion.

Air Canada Ltd.—Toronto, is the managing of Canada's effort in

advanced plane types and engines. It already has tested the first four-barrel jet engine, the Canadair. This will serve as a model for development of engines to power a Canadair-designed fighter engine, the C-108. It is also receiving the prototype jet engine, XC-102 (page 12).

In addition to work on advanced aircraft and engines, one of the most important aspects of Ross's position is that of the company in the Dominion sector of the British Commonwealth. It is working on the production of the Boeing, single-engine biplane fighter. It is working on parts for the E4E, four-engine biplane fighter. The latter Canadian component is expected in modification and overhaul.

Canadair Aircraft Co., Montreal, is doing overhaul at the present. It already has produced the prototype British Lightning engine plant and the single-engine Newtons fighters which it took over from Northrop Aircraft.

Other contributors in Canada are Canair Aircraft Ltd., Hamilton, which is going back into production of Piper Cub's Engineering Products Co., Montreal, which has recently been a contract between and Bell Aircraft, Canada, Ltd. which has been located, reliable at least to service Bell's various plants in Britain but also in Canada.

Several other British firms are manufacturing in the Dominion, including Bristol Aircraft and Phoenix, which has recently formed a Canadian associate.

Before 1918, Canada produced hardly more than 100 planes a year. The war has put the U. S. gun in the world the Dominion being expanding its aircraft manufacturing. There were 21 jet types of planes produced in Dominion, although only two were of Canadian design.

Wind Tunnel Repairs To Be Finished Dec. 1

The Southern California Cooperative Wind Tunnel, put out of commission in September when a blade failed, will be back in operation by Dec. 1, according to Dr. Clark B. Millikan, director of the tunnel.

The incident, which caused damages

estimated at \$538,000, was due to its design failure in the shaft of one of the 16 blades in the upstream propeller hub. Millikan says in a report to the aircraft company which was the big cost factor.

Damage—The blade pulled out of its socket, shook other blades in the upstream propeller and then whirled downstream, shattering off 56 blades of the second stage propeller. Serious vibration resulted in loosening of some of the supporting links of the blades and suspension system. There was other minor damage.

The block which failed had operated a total of 2500 hours before the accident. All apparently undamaged propeller parts are being inspected, and the entire tunnel will be given a critical inspection.

Could the California tunnel be returned to operation, experts here have been studied in the recent Cornell test at Buffalo. Spare parts from the Buffalo facility are being used to repair the California tunnel.

WHO'S WHERE

General Elwood Co. appointed W. V. O'Brien general sales manager of its apparatus department, manufacturing division. O'Brien has been with GE since 1922. He has been assistant sales manager since last December.

GE also made three changes in its chemical department. It has appointed William H. Coffey, former manager of plastics division to assistant manager of the department.

Dr. Charles E. Reed from manager of the chemical engineering division to assistant manager of the department.

Harry K. Coffey has been manager of the new and creation materials division to manager of the plastics division. John L. McNamee has been manager of the new and creation materials division to manager of the plastics division.

Sperry Corp. elected George C. Dely a vice president. He is president of New Holland Machine Co., New Holland, Pa., a Sperry subsidiary.

Republic Aviation Corp., Farmingdale, N. Y., appointed Robert A. Miller assistant to the president. He had been executive vice president, vice of Monro Mfg. Co., Bushkill, Calif.

Lessie, Inc., Grand Rapids, Mich., named G. Lester Jones chief engineer. Recently he was assistant to the president of Indian Motorcycle Co., but he was previously vice chief engineer of Sperry Products Co. and later of Sperry's production manager of Sperry Chevrolet Co.

ENGINEERING



First Jet Transport: Avro XC-102

Canada's contribution to high-speed passenger service nearing completion. Designed to seat 40, cruise 430 mph. at 35,000 ft.

In the Avro XC-102 the Dominion of Canada has something brand new in the commercial transport field—a 100-percent-jet-powered design with an economical cruising speed 200 mph faster than the recent American-type Flamingo tests of the prototype are scheduled to begin in February, 1945.

The all-metal craft is an auto-city, clean in design, low wing configuration with nose wheel gear, and carries 40 passengers plus crew of three in a pressurized cabin.

Power is supplied by four 1,500-hp. (one thrust 1,571) Rolls-Royce Derwent V (and) turbojets giving the 52,500-lb. liner a cruising speed of 430 mph at 35,000 ft.

A noted American transport technician has said of the XC-102, "Everything that is wanted by an airline for maximum efficiency, combined with definite safety, is incorporated in this design."

Four changes have been taken in installing standard equipment or novel production methods.

► **Background:** The Avro Canada XC-102 was originally announced, according to Chief Designer E. H. Alden, as "the answer to the airline operator's need,

which, since about, have not been met even by the most up-to-date of current types."

► **Manufacturing work** was laid down in 1944, conforming to specific requirements of Trans-Canada Airlines, with appropriate changes for domestic routes.

Costs of original layout engineering and planning and the two prototypes now under construction were not unduly high by TCA, but are borne by Canadian government for the Royal

Canadian Air Force, and by Avro Canada.

All design and construction was completed at 1,500,000-sq-ft. Malton plant, a modern factory now situated on the border of Toronto Airport.

When the XC-102 design was first drawn, the engineers applied much of the British Avro Tutor technique. But as many British techniques were incorporated into the Avro Canada design, the design progressed quickly and now owes very little to the original British concept.

First thoughts were to use two, as first ordered. Rolls-Royce Avon radial-flow turbojets, each with 6,000-7000 lb. static thrust to speed up prototype trials. The Avro has been dropped temporarily, and the low Rolls-Royce Derwent V's utilized.

Naturally, the jet needs more air flow than can be met by propellers on each wing, but Avro Canada engineers are not unduly concerned about reduced drag.

► **Key Personnel:** When the first prototype flies next February, Chief Test Pilot D. H. Rogers, a Canadian, will be at the controls. He is scheduled to go to the Avro plant of the Hamilton-555

Editor's Note: The accompanying article is the first detailed report on the world's first airplane designed from the start as a jetliner transport and actually under construction. It was written by Charles W. Cain, editor, used at the discretion of this column, of "The Aeroplane Spotter," noted British aviation journal. Mr. Cain is in the United States at the invitation of AVIATION WEEK. On a side trip to Canada he found the plant of A. V. Roe Canada Ltd.

NEW!

High Strength

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Illustrates D-4 Engine mounts



—with the famous Self-Locking Red Elastic Collar that protects permanently against IMPACT! VIBRATION!

The NEW ESNA High Strength-Double Red Nuts have been scientifically engineered to accomplish distribution of shock load with minimum weight and strength increase. They develop 105,000 psi stress in 7/16" high strength standard bolts, and are completely interchangeable with existing standard screwing nuts on these double Red designs permit a weight reduction of 40%, and a height reduction of 20%. The unique mount fittings of the D-4 design show clearly. Elastic base fitting can now be replaced. Double design advantages are pointed for such problems as: Corrosion, Fire, Impact, Repetitive slip, Abrasion, and opening and closing with D of pre-impregnated

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Further—like all Elastic Stop Nuts—the NEW High Strength Nut remains self-locking in both fully seated and partially seated stages.

HERE'S A CHALLENGE: tried in complete loads of your toughest bolted trouble spots. We'll supply test data—FREE, in confidential quantities. Or, if you want further information, write for literature. Elastic Stop Nut Corporation of America, Union, New Jersey. Representatives: Avro Canada, Ltd. and Avro Inc. located in many principal cities.



ELASTIC STOP NUTS



PRODUCTS OF ELASTIC STOP NUT CORPORATION OF AMERICA

AVIATION WEEK, November 1, 1945



Avco XC-102 nose section (left) and wire-cable bracing section reveal strength of structure required for high cabin pressurization.



delly Group, at Woodford, Louisiana, is giving multi-jet transport experience by flying the Avco Tudor II, powered by four Rolls-Royce Trent turbojets. This craft is for research only.

Since design was started just over two years ago, fewer than 80 designers, engineers and technicians have worked on the XC-102. Key men at the Aircraft Division's British low-shelf design team, who are assisting in the low-key Chalkley, together they worked on the Manchester and Lancaster lineages, the York and Tudor transports.

Nineteen men man a another Britisher, J. C. Floyd, assistant chief designer, who is largely in-charge of the Avco XC-102, but is also responsible regarding expected performance.

Looking after fatigue problems is P. H. Dismuth, chief engineer and manager of the Gas Turbine Design Division, a Canadian who previously worked with the National Research Council in Canada (1973-74) and Great Britain (1961-64). Before joining Avco Canada, he was officer-in-charge of the Civil Test Section (1944-64) when over 100 of the NRC by Turbo Research Ltd.

Chief Metallurgist is British exRAF R. Smallman-Tee, who was with Armstrong Whitworth part of the Hawfield Equipment Section World War II.

There was previously responsible for the press leg in British Sir Roy H. DeLong, president of Avco Canada, Canada's Walter N. Deslaur, vice president and general manager (overall general manager of Toronto), and Canadian Fred T. Smyth, assistant general manager.

Avco Canada is not working under parent Avco Manchester (Fingland) but is a self-supporting unit of the Hawker Siddeley Group. As a total compact team, it is very conscious of its

role in the latest world market jet jet transports.

It capabilities are enhanced, the XC-102 will be widely sought after. Quiet flying is the choice of its broken wing or excessive cabin noise and unwanted vibration of the contemporary jetliner passenger transport.

Descriptive Data

Although declining to give extensive data on the XC-102 and its low-fare, low-costline Avco Canada did permit release of basic details on the full-scale mock-up and the two prototype under construction. This allows sufficient scope for close approximation of various factors, including some dimensions, weights, and performance data.

► **Weight**—Length of the structure is 57 ft. It utilizes a conventional circular cross-section similar to the British Tudor series, and is stress-optimized and fully pressurized.

Special attention has been given to air conditioning in view of the extreme temperatures being studied in Canada. Results of the limited test of the XC-102, the single-cylinder construction has been found practical, simplifying many problems associated with pressurization.

► **Passage**—This is 2457 aluminum alloy, with flush riveting throughout. Fixtures are supplied by Aluminac Company at Canada. Frames and bulkheads are fabricated of 7057 sheet. Two two sets of frames come from England by ground up production but later models will be built with all-Canadian pressed parts.

► **Main Components**—The first major flight systems are (1) Nose, including the step-down cockpit and nose-wheel gear installation, (2) pressure bulk-up, baggage and mail compartment, and forward entry hatch (port), (3) 40 seat passenger compartment and rear entry hatch (port), and (4) tail section, housing the rear baggage compartment and entry hatch (starboard). Combined areas of front and rear baggage compartments total just under 300 sq. ft.

► **Cockpit Details**—Crew will consist of pilot, copilot, handling and radio operator and stewardess. A spare seat is situated behind copilot's for use of a visitor.

► **Luggage**—Storage is simple and follows standard practice. All extra capacity is being obtained from the States.

► **Wing**—Standard plan is being tried for analyzing on the wind-tunnel, using as a c/s system with a power range of 6-50 hp.

Some electrical equipment is duplicated to increase limited taxiway taxiway facilities.

► **Passenger Accommodations**—A central aisle divides the compartment into two seats of 31 seats. All except the first four seats face forward although this is not necessarily standard. As a 30-seat transport, these forward seats would be removed.

Small diameter, double-thickness portable type windows are used. Because large, heavy windows would complicate pressurization and design factors.

Cabin accessories will be of Canadian manufacture, and seats will be produced in the Malton plant.

Beyond the rear two seats on the portside, and forward of the rear entry door, is a lighting, power, and temperature panel for use by the stewardess. To the rear of this door is the engine power room and control effects. ► **Pressurization**—In-flight inspection is possible by connecting all cabin



Interior view of wire-cable bracing (left) shows pressure dome at end. Right: Rear section, with seats for lower portion of fuselage.



retrofits, smoke cleaner and pressurization gear in the forward compartment (behind cockpit), in contrast to other designs where passenger compartment ancillary units have been placed under the cabin floor resulting in added floor maintenance problems and crew placards.

► **Nuclear**—Nuclear pressurization equipment, in cooperation with the standard Godfrey Brothers blower, can cut a maximum pressure of 8.5 psi, but the cabin can be safely subjected to 10 psi.

► **Pressurization tests** were based on theory by the Hawker Siddeley Group trials with such types as the Tudor series. The XC-102 high pressure differential range is at 10,000 ft. 8.5 psi sea level conditions at 21,500 ft. operating altitude, 2000 ft. conditions of 25,000 ft., 10,000 ft. at 30,000 ft. and 6000 ft. at 35,000 ft.

A special distribution mechanism will be employed which will give "seam wall" feeling to the cabin.

► **Wing**—Wing total span is 98 ft., the Rolls-Royce wing is produced on the orthodox two spar principle but with the difference that the closely spaced stringers in cooperation with the tapered thickness skin (0.125 in. at root tapering to 0.040 in. at tip) are designed to take care of torsional rigidity.

This is especially important, because of the high gust factor associated with low wing loadings and high speeds.

► **Wing**—is an NACA symmetrical section (thickness about 16 percent from leading edge) and no attempt has been made to reduce the thickness to gain additional speed. (Example is the British Armstrong-Whitworth A W 51.)

► **Diagonal** stringers 2 in. instead of the jet section.

► **Wing root** flares are unusual. The

hinge-to-wing leading edge is shaped to cope with drag root upwash and consequent "popping." The leading edge is also equally prominent.

► **Ordinary** light flaps are incorporated. Inboard flap tanks holding 3000 U.S. gal are built into the wing inboard and outboard of the jet engines. If inboard tanks prove unsatisfactory these a provision to accommodate collapsible bag tanks.

The emergency is a ball-balanced overhauled structure of simple design but conventional construction. Tail plane span is 77 ft.

► **Wing Attachment**—Roller bear then roll arriving is incorporated in the wing leading edge. Developed by Goodrich in cooperation with NACA's Cleveland Lab, it has been reported that this new wing bearing has not, as the past, proved completely successful, but Avco Canada thinks it to be the answer to their low warbur problem.

► **Power Plants**—The four 1500-hp turbofans, British-built, will power Avco, since the Rolls-Royce Avco main turboshaft would not be as practical as the four Avco Canada powered jet engines for safety operation. They include bleed ratio and automatic shut-off coils to prevent possibility of external superheated explosion, which has been responsible for a number of mishaps recently.

► **Power**—units are mounted independently in a housing and attached under the wing tips. The engine nacelle is integral, and the forward is equipped with outboard fuel extraction.

No appreciable noise is expected in the cabin than the jet exits because the exhaust is away from the fuselage by a power margin.

► **Even** if the overall weight of the

craft is exceeded, it may be offset by greater thrust from the Derwents by engine development of the engine or 123 fuel tanks and the maintenance hope to increase its power.

► **New**—low-fare jetliner, the Avco Canada T.B. 5 Grend, may be used as the future, but at least a year is needed in development.

► **At present** Avco Canada does not favor the turbojet as a power unit, one of the chief reasons, apart from operation, being the failure of popliteal and wing vibration.

► **Leading**—Grease-Oil is important feature of the XC-102 design is the very light undercarriage, consisting of twin oleo main and nose gear designed by Dorety in England. Lockdown is obtained by short-length oleo units. Main wheel attachment is on the rear spar, the wheels retracting forward to fit in between the twin struts. Hydraulic retraction is used.

► **Popular**—type of airplane pilots is length of takeoff and landing. The XC-102 is lightly loaded (overall weight of 35,500 lb. for a payload of more than 10,000 lb.) at a stall speed of under 4000 ft. compares favorably with contemporary transports.

► **With** 1,000,000 sq. ft. of production space available, the Malton plant employs under 2000 persons (5000 employed building Avco Lancaster bombers during last war). With these facilities, combined with the projected first flight date of February 2, it looks as if Canada will beat both Britain and the U.S. in the race jet transport line.

► **President** Sir Roy H. DeLong stated recently that following Avco Canada's own test program, the prototype XC-102 will be delivered to Trans-Canada Airlines for operational trials next year then the beginning of 1950.



This will be production configuration of United Helicopters' Hiller 360 utility aircraft



Apparatus for pulsating and vibrating torsion torque test



Stator drop test for main rotor shaft

How A Helicopter is Tested for CAA Certification

United Helicopters is latest company to get type approval, lists steps for requirements.

After almost ten years of experimentation, and investment of hundreds of thousands of dollars, Stanley Hiller, Jr., via his United Helicopters, Inc., finally has produced a certified aircraft!

Just what is involved now is technical procedures to obtain such CAA recognition for a copter?

Since the "Hiller 360" is only the fourth—and last—helicopter type to be commercially introduced in this country, Associate Wagon has asked Mr. Hiller to describe what a manufacturer is up against when it tries to obtain official approval for a rotary wing craft.

Here's the story of what led to the final design, and what was done by the Palo Alto, Calif., manufacturer, to get the certificate.

By 1946, United Helicopters had made its final decision on the type of aircraft to produce in quantity. This decision was made after carefully evaluating information gathered from actual flight tests of several designs.

Since 1939, Hiller had strived to build a production helicopter. His first efforts culminated in the flight tests of the original Model NH-40, a control copier.

Then came a two-passenger, 235-hp rotary wing craft produced during the war, followed by a simplified, 125-hp control design which was later developed into the "Comanche."

After that, an extremely simplified

control mechanism was produced and first tried on a flying test machine using jet force at the tail to simulate rotor thrust.

Finally, a lightweight basic for a tail-rotor type copter was developed. This was equipped with United's exclusive servo control system, giving a sensitive control—essentially stable—the Hiller 360. United chose this design for production.

▶ Moving Platform Tests—After more than 75 hr of flight testing, the copter was mounted on a special platform set out on a track. This test rig, when driven at speeds exceeding 65 mph, simulated many conditions of flight which would be encountered with a more heavily loaded, larger craft of similar configuration. A full-scale gear conducted the analysis.

By slowing the rotor and increasing track speed, various tip speed conditions, blade loading to angle conditions, etc., were analyzed. A special deflector ring mounted just under the main rotor was used to determine the angle of the swirling disk.

▶ Configuration Speeded—Next phase of development of the first production helicopter was to design a unit around a presently available, 178-hp engine. A hubcap of three passages, 2385 lb gross lift craft was constructed.

It was at this point that CAA was advised of United's interest in obtaining a license for a copter of this general configuration and control system, pulled up from the master flying test frame, which by the time, had logged over 125 hr.

▶ Components Tested—After many



Landing gear structure is drop tested



Rig for torque-loading of main gear box



Strain gage attachments on rotor control



Flight test frame on mobile rig



Vibration test setup for tail rotor section



Ceribated 360 seats after Douglas, San Francisco Airport manager, Frank W. Pittman, (not pilot, and Eugene Baker, politician. On ground are George Trone, vice-president of the Fawcett's division of General, Stanley H. H. (center) and Howard R. White of CAA, who is handling the Administration's certificate in Hiller.

months of design, various size, size and fuselage were built and the four parts for civil tests were manufactured. First structural assemblies, such as the end of the tail boom, were distinctly loaded to requirements.

Main and tail rotors were ribstayed and supported by a specially constructed apparatus. Electronic stress gage equip-

ment was used, and a special clock kept an accurate record of time on cycles as recorded on the wire strain gauge under study. The system was arranged to stop automatically if a break occurred in the structure.

Main rotor blade was also subjected to stress tests. Recent United had designed and

built its own landing gear structure, it had to carry out its own drop test program, and a specially constructed drop stand was developed.

Tires and tubes could be used only for a few drops because at each impact it was employed that the tire would set through.

Main gear box was mounted to a large pipe to be able to provide support and base on an actual flying wing. Main gear engagement was used to keep a complete record.

A combination air-and-water apparatus was constructed to permit and verify the tension tension coils for both static and full rotor assemblies. Over 13 tests could be developed by the same gear holding the rod.

Flight Tests—After completing tests on the various parts and component assemblies, the first flying program was undertaken.

The craft was flown for 15 hr., and small adjustments and changes indicated by the flight were also incorporated.

It was at this time that CAA (later noted a Type Certificate (TC) Board At United's plant these tests made a thorough study of the rotor, and the details of their comments were incorporated in the basic design of the 360.

• **Tailboom.** Run—Not phase of the CAA test program was the 100 lb., end-of-run, blow, 90 percent of the tests was run at full power with rotors positioned at 60° forward flight angle.

To expedite the procedure, 6 rows of 2 rows each on 24-hr. duty, and the complete 100 lb. tests required a total of only 130 hr. The extra time was required for ground up and checks at frequent intervals. Three CAA rotor assemblies were on hand during the operation.

Upon completion of the 100 hr. ground run, the rotor bearings were disassembled, Magniflexed, X-rayed, and otherwise thoroughly checked for defects. This, also, was done under the guidance of CAA, representative of • **Outboard Check.** The 360 was then assembled, and flown again for approximately 40 hr. Electronic coil lograph equipment was then installed to record the various stresses which occur during flight. The coilographs were sent and used over positioned to a permit operation during any phase of flight.

While stress gage tests were being carried out on the first finished logograph, the press structure of a second 360 was being steadily tested to destruction.

Following this, additional flight tests were conducted on the first Miller 360 for final CAA approval.

The standardized cockpit has an open cockpit and is controlled by United to offer more immediate industrial use.

Plastic Film Devised For Electrical Heating

Extensive research application is now planned for a new electrical-conductor plastic which can be sprayed on an air flow and upon using becomes a heating element.

Douglas Aircraft Co. has already begun using the material for thermal coating of the EC-3 cabin air circulation heater system. This one-panel-coating aluminum part is sprayed with 45 cc. in of the product, known as Electric Film.

The element receives 230w. on a 27v. circuit and maintains an average temperature of 180 F. during flight operation of the heater under any conditions at 34 F. outside air.

Engineers of E. R. Hill Co., 7170 E. Laurel Canyon Boulevard, North Hollywood, Calif., developer and manufacturer of the material, say that the element is less subject to burnout than air wire heating installations.

The plastic substance is being tested also for heating of aircraft gas inlets, nozzles and burner discharges.

New Data on Jet Steel

Results of recent research on superalloys, a synthetic compound formed by certain alloying atoms in steel subjected to high temperatures, are expected to influence the metallurgy of high heat resistant steel in jet engines.

The studies conducted by the metal working (rolling, hammering, and drawing) and other previously received, the greater and more open will be the formation of the super alloy.

It was discovered, too, that the grain size of a structure called delta ferrite also increases remarkably the super alloy formation.

The investigation was conducted at (then Institute of Technology by Dr. Otto Zemanic, director of the metalurgical engineering department, Dr. Paul Ken Koh, associate director of research at Allegheny Ludlum Steel Corp.'s steel and steel division, and John J. Gleason, Campbell Fellow at Columbia University.

Aids Drafting Procedure

T-Square, made by Instrumental Industries, 256-71 West Jackson Blvd., Chicago 12, Ill., is constructed to provide complete view of work area on which it is placed and reduce possibility of misreading working surfaces. Device is molded in one piece of transparent, clear plastic, has double head to both ends are visible, and fits which provide 63° on above and below for smooth moving.

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For your convenience, there are 15 carefully selected colors—plus black and white—in the complete Sherwin-Williams Aircraft Color Line. These colors have been chosen for their purity, richness, glossiness, brilliance and outstanding durability. Pigments are pure, smooth, color, low dust, easy mixing (except where blue is lightened by addition of white). And all of these colors are available in four types of finish: Opex Pigmented Nitrate Dope, Opex Pigmented Dyeing Dope, Opex High Gloss Lacquer, and Opex Synthetic High Gloss Enamel.

In addition to this comprehensive color line, Sherwin-Williams offers selected finishes for every surface and area you need: floor, step, equipment to offset and fringes. The Sherwin-Williams Co., Aircraft Division, Cleveland 1, Ohio. (Sales Division, Newark, New Jersey).

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SHERWIN-WILLIAMS
AIRCRAFT FINISHES

HILLER 360 FUNDAMENTAL DATA	
WEIGHTS—Maximum certified gross	2347 lb.
Empty.....	2147 lb.
Useful load.....	100 lb.
FUSELAGE—All metal stress-monocoque construction	
Minimum weight.....	10 lb.
Length (tail rotor vertical).....	128 in.
Height (to top of rotor).....	214 in.
CABIN—Walls (in steel)	612 sq.
Length (tail back to nose).....	514 in.
POWER PLANT—Woodruff Motors, Inc., Model 6V-475-B33, 175 hp	15 lb.
MAIN ROTOR—Diameter	2
Number of blades.....	2
PERFORMANCE—High speed	54 mph.
Maximum weight.....	75 mph.
Cruising speed (70 percent power).....	308 mi.
Range.....	75 hr.
Endurance.....	400 lbs.
Vertical rate of climb.....	900 ft./sec.
Maximum rate of climb.....	10,000 ft.
Maximum vertical interval altitude (no wind).....	5000 ft.

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SALES & SERVICE



First picture of engine test propeller used by Aeronautical Research Foundation in direct turbine tests under NACA sponsorship at Boston, show the foundation's latest experimental plane variously equipped

with three 160, four 160, six 160 and eight 160 propellers. Two basic hubs, one with conventional two, four or eight blades and one which accommodates three or six blades, are used in the series of tests.

Noise Problem Up to Industry

Results of NACA-sponsored experiments demonstrated with two stock models modified for sound reduction.

By Alexander McIlwain

From now on, addition of the light airplane when public agencies essentially only on the industry's willingness to act.

The way to make personal airplanes quiet and remove community objections to the noise of their airports is clearly stated for plane manufacturers by the Aeronautical Research Foundation's NACA-sponsored experimental program at Boston.

Individual Problems. Whether the manufacturers will still hold back at

they have done in the past is largely an individual problem until one boss decides his company will make the engineering investments required for quieting his airplanes. As soon as one manufacturer does it, the other companies probably will have to provide competitive designs.

A year of experiments at Boston revealed public organizations at the second meeting of National Association of State Aviation Officials when representatives of more than 40 states watched a demonstration of two well-known stock models, a two-place and a

four-place, modified in that at 100 ft. altitude they simulated the desired engine operating conditions.

Modified.—The planes were a Stinson Versair 150 and a Piper Cub F3 two-seat trainer, models which probably sold in greater numbers than any other power-built lightplanes in their classes. Modifications in each included a reduction gear and muffler and a four-blade fixed propeller.

The Cub installation used a 3115P Leaning four-cylinder engine, the type currently used to power the four-place Piper Family Cubair. Reduction gearing of 0.612 was accomplished by using an intermediate gear of 1.64 between engine and propeller. Such an installation promises to be a relatively inexpensive solution to the growing problem inherent in quieting airplanes.

More Experiments.—Private plane manufacturers will doubt additional experience on such installations before making them standard on their production airplanes. But the fact that the Civil Aeronautics Administration has licensed commercially the Mooney M-18 six-cylinder which uses a credit V-belt drive is indication that this type of installation is gaining engineering acceptance for general use.

The muffler used in the Cub is the custom muffler designed by Prof. Otto Kopper of Massachusetts Institute of Technology, which serves as dual as passively to quiet the engine as well as quiet it. A straightthrough tube is used with a muffler of Fibreglas, which can be used because of the low temperatures of the exhaust.

CFR Enforcement.—Operated in a number of places, the Cub model meeting short takeoff and short landing in a five-acre strip near the Cambridge, Mass. of the Charles river, although its modifications and been made on the standard Cub wing. The light loading, the extra power and the greater efficiency of the down-turning propeller all contributed to the performance.

Prof. Kopper is interested in developing a similar plane with high 35 degrees for still shorter takeoff and landing. Such landing characteristics are necessary in addition to the quieting of noise for the operation of planes on small class-airways.

Noise Reducer.—As the Cub and the Stinson flew overhead at altitudes of around 100 to 300 ft., their small engines at noise levels completely drowned by automobiles on the street alongside the strip and by a two-engine transport aircraft which flew past at about 2000 ft. altitude.

The Stinson uses a Franklin six-cylinder engine similar in most respects to the Franklin helicopter engine, which develops 100 hp at 3000 engine rpm. A reduction gear with the same reduction ratio as the V-belt reduction gear

AIR TRANSPORT

No End in Sight for Cargo Fight

CAB orders reopening of records in air freight case before decision on certifying all-cargo carriers.

By Charles Adams

The transition from all-cargo to ramp service has brought passenger-carrying airlines and their all-cargo competitors face has been extended, at least by a CAB order which says the certified carriers have a new deadline to appear for a new deadline to appear to spotlight the historical weaknesses of the airlines.

Lated operating reports of both certified and noncertified participants in the air freight route case will be placed in the proposed record of the proceeding when a new hearing is held, probably in December. The CAB does not say which will determine whether it is in the public interest to certify all-cargo carriers but has been delayed until some time next year.

Pitney Challenge—Last spring, the certified airlines began objecting to a reopening of the record, alleging that new evidence of the alleged weakness of cargo carriers has thus been delayed until some time next year.

Pitney Challenge—Last spring, the certified airlines began objecting to a reopening of the record, alleging that new evidence of the alleged weakness of cargo carriers has thus been delayed until some time next year.

New data will show that at least five of the twelve major all-cargo carriers which presented their arguments for certification in hearings held two

years ago are no longer in business. Several others have undergone bankruptcy reorganizations and at least one was operating on a company-wide liquidation. One applicant has never been active in a carrier, confining itself to leasing planes pending determination of its bid for a certificate.

Largest Carriers—Reports also are filed with CAB indicating that only two air freight—Shack, Alaska, and the Flying Tiger Line—were carrying significant quantities of cargo throughout the first half of 1945. Shack flew 11,579,715 ton miles in the first six months of 1945, a 35 percent gain over the same 1944 period. The Tiger flew over 6,000,000 ton miles a 400 percent gain over the first half of last year.

U.S. airlines which resumed service last May after having suspended operations for six months, retained only 52,715 ton miles of business in first half 1945. In all of 1947 it flew 1,332,256 ton miles.

U.S. Air Service reported flying 916,661 freight ton miles in first half 1946, compared with 2,226,641 in all 1945. California Eastern Airways, which filed action in bankruptcy and surrendered operations last May, flew 1,531,225 ton miles in first quarter 1946 against 11,505,642 last year.

Foreign Air Service, which flew 17,976,763 freight ton miles in 1947, reported 521,651 in the first half of 1948 during an operation despite a bankruptcy filing. The Flying Tiger Air Corp. Transport Corp. flew 235,345 ton miles in the first quarter of 1948 against 2,884,543 ton miles in all of 1947.

ACTC—The ACTC is a person his representative in the proceedings.

Certification—Shack, the Flying Tiger, Wills, U.S. and California Eastern were recommended for certification in a report by CAB members last March.

In view of the numerous business failures and certified operators by some surviving companies, uncontrolled shippers that may not and could not meet 1947 traffic volume of about 63,000,000 ton miles. Last year, Shack, Wills, California Eastern, the Flying Tiger and Air Cargo Transport accounted for nearly 45,000,000 freight ton miles. These four carriers predicted they would fly over 101,000,000 ton miles in 1945—a volume which in the time appears to be fit out of reach.

Regular Carriers—By contrast, the certified carriers should without exception have made usable gains in freight volume this year. During the first half of 1948 the 16 domestic trunklines flew 26,766,000 freight ton miles against 12,289,900 in the same 1947 period and approximately six ahead of the independent.

American Airlines' freight volume hit a one-all-time high of 2,211,900 ton miles in September, more than 300,000 ton miles above the previous record set in May. United Air Lines freight traffic also was at a new peak, reaching 1,481,130 ton miles in August, 71 percent above the level of the same 1947 month.

Lower Income—Financial picture of the all-cargo line western gateway, which is not yet open to CAB, is not as good. Through last June, Alaska Super independent freight lines had lost around 57,000,000 in the postwar period.

Shack led a \$1,501,714 deficit through Dec. 31, 1947, and lost another \$77,679 in last quarter of 1948. The Flying Tiger led a \$1,281,936 deficit through June 30, 1948, including a \$19,460 loss in the first half of this year.

Wills reported a \$51,214 deficit through last June 30 despite a \$22-151 profit in the first half of 1948. U.S. led a \$1,755,511 deficit through last June 30 including a \$115,340 loss in fourth 1948. California Eastern closed a \$76,213 deficit through last Dec. 31 and lost \$661,794 in the first quarter of this year.

An Air Cargo Transport had an \$651,541 deficit through Mar. 31, including a \$26,794 loss in the first quarter of

1948. Flanagan Air Service posted a \$277,255 deficit through last June 30, including \$33,797 loss in the first quarter of this year.

No Reservations Available—The independent states that the certified airlines have lost volume of orders on air freight, but it is better here than elsewhere on truck loads. Reports indicate to pass the point CAB public control last spring found that regular passenger-carrying airlines were handling much of last freight traffic at rates which were below cost.

Last month, Shack Airways charged that American Airlines had adapted "primary rate policies" despite CAB's order of last spring prohibiting such rates. Shack and associates was attempting to drive both prices and the open bid maximum on practically all commodities between actually all domestic points CAB ordered suspension of the second rate for 90 days pending reassignment.

In setting the maximum rates (16 and 15 cents a ton mile depending on the rate of the shipment and the route), CAB had ordered both certified and noncertified carriers to work out their charges "above" the floor. The Board and establishment of the entire freight rate structure at the maximum would defeat the purpose of the maximum unless the traffic could be justified in the form of demonstrable depletion in cost.

Shack stated that American, Capital, Delta, Northwest, TWA, United and Western had proposed dropping their freight rates to the legal floor despite evidence of rising rates. It depicted Northwest Airlines' allegedly filed CAB application to increase its freight rates as an average of six cents a ton mile because of higher expenses.

Costs Up—"Our own costs have not decreased since we filed in on the maximum side," Shack declared. It said the certified carriers' freight rates rose at least twice as high as Shack's. Meaning of American's new rates would increase Shack's revenues by about \$36,000 monthly. The independent freighter declined.

"In the light of CAB's policy in setting the financial picture of American and other certified carriers, it would seem more difficult to justify approval of freight rates quite obviously below costs especially a loss their rates have been proposed with the apparent intention of forcing CAB to set a 4-cent traffic rate new moving in substantial volume over other airlines," Shack declared.

"The end purpose of American's disclosure is to bring about failure of the exclusively air freight routes."
How to Operate—American's current rates can only be understood if we assume either their complete cessation or their total disregard of costs and

the revenues necessary to meet them. Unfortunately, such a policy, otherwise said disastrous to them, is only possible because of their past subsidy.

Shack said that while American had little or no record for its own freight losses it sought to inflict deficits on the independent freight carriers and thus to eliminate the truck losses. Together with freight reorganizations and other all-cargo lines, Shack had proposed CAB's recent decision which stated that losses incurred by the certified airlines in cargo operations must be underwritten by the same extent as losses on passenger operations (November 27, 1947).

Capital Elects New Vice Presidents

Capital Airlines' board of directors has elected James B. Franklin, former James of operations, and James W. Austin, former director of traffic and sales, to occupy vice president



James B. Franklin



James W. Austin

Franklin, a flyer since 1925, joined Capital as a captain in 1934 and was promoted to captain the next year. He has logged over 33,000 hours of flight and was in the Army Air Transport Command during the war.

Austin has been with Capital since his return to civilian life from the Air Transport Command in 1946. He has been instrumental in bringing about general acceptance of air transportation by major federal agencies as a means of moving to and from out-of-town points. He is the creator of the direct mail program which this year was so successful for the last in the industry.

Ten Carriers Ask New Coast-to-Coast Routes

Capital Airlines has passed up after certifying CAB a route to new southern transcontinental routes.

The new application requests extension of Capital's Route 51 from Memphis to San Francisco via Birmingham, Fla., Dallas, Ft. Worth and El Paso, Tex., Tucson and Phoenix, Ariz., San Diego and Los Angeles, Calif. It also asks extension of Capital's Route 53 from Atlanta, Ga., to San Francisco

via Birmingham and Mobile, Ala.; New Orleans, California, Houston, Texas, San Antonio, El Paso, Tucson, Phoenix, San Diego and Los Angeles.

Northern Routes—Providence, R.I., Dallas, Dallas, Continental, Eastern, Chicago & Southern, Eastern, Transamerica Air Transport, Pacific International Airways, Northwest Airlines, Western Air Lines had requested southern transcontinental routes. In addition, Transamerica Airlines wants air links from El Paso and Dallas to New Orleans.

But CAB is looking for an alternative to new routes in view of the industry's heavy losses and widespread pessimism regarding economic cooperation in a consistently unprofitable industry. It is planning to determine whether any single plane service between such eastern points and the West Coast could be established by appropriate arrangements between the operating carriers in the area—American Delta, National and Eastern. This equipment interchange proposal has been considered given the same case with the route application.

TWA Expects Boom In Overseas Traffic

International airlines expect 1948-50 to be peak years for trans-Atlantic travel according to Charles L. Gable, general sales manager for international operations of TWA.

But returned from a two-month inspection of overseas routes, Gable points to increased use of air travel, more flights, more airlines, better service and a reduction of the existing lines. He expects some thousands to travel to the Victoria in August for 1948 but new subscriptions in TWA for 1948 are only 15,000 compared with 1947.

Golden Flock—A war in European production of manufactured materials, and the fact that shipping companies are already sold out for civil use also was noted.

Gable claims that for 1947 and the first nine months of 1948, 173,000 trans-Atlantic trans-Atlantic passengers flew. TWA's number carried over a total of 538,000, including a number of transportation units, in Europe.

Cargo Business—He described what he termed "hot-outgoing and wilder traffic" for non-scheduled trans-Atlantic cargo routes and claimed that the scheduled lines could handle the cargo business "or at least CAB thinks so."

"While TWA anticipates more business it will not have to buy additional aircraft," Gable said, but will seek greater utilization of the planes it now has. The carrier intends to revive its charter business and will not carry over its international routes for this purpose.



First official press of the complete first into Civil Aeronautics Board headed by Chairman Joseph P. Cotton, left, who was sworn in last April, shows, left in right, Member Harold A. Jones, Republican, Vice Chairman Oswald Rice, Republican,

OTC, Democrat, Member Bob Lee, Democrat, and Member Richard B. Adams, Democrat. Board took office last March and Adams took office in May. Chairman Ryan took will be the first to retire or terminate on Dec. 31 of this year.

Bargain Rates Begin Test Period

CAB gives Capital 90-day trial for sky-coach fares, asks detailed reports on American's family plan.

The next 90 days may comprise the critical test period which will determine whether the nation's certified domestic airlines can make money by adding transportation as a depreciable stock item.

The Civil Aeronautics Board, which late last summer called for a general fare increase, apparently has decided to give long-haul carriers a seasonal trial. But at the same time it has taken steps which bordering upon transportation of special fare planes if they result in more traffic than the test.

► **SkyCoach Approval**—Extent to which CAB will allow airlines to use the Civil Aeronautics Board's new rules regarding ticket volume was demonstrated last week when the Board permitted Capital Airlines (PCA) to establish sky-coach service between New York, Pittsburgh and Chicago for 90 days. The Board's ruling came despite United Air Lines' protest that Capital's sky-coach rates are uncompetitive and discuss more and could adversely affect the level of charges available to other carriers (Aviation Week, Oct. 15).

In its complaint, United stated that if Capital's proposed sky-coach rates are approved, other carriers might be reluctant to combat the new rates. United Chicago tariffs. "Moreover," UAL contended, "it cannot be assumed that such rates could be matched only to the New York-Pittsburgh-Chicago route. The implications of Capital's sky-coach experiment are far-reaching."

Capital's sky-coach service originally was scheduled to begin on Oct. 15, but CAB refused to approve the trial on such short notice. The 90-day operation conducted with 50-passenger DC-4s, a rate stated to go under way this week, according to a generally reliable source, may be extended to other American Airlines will cause further delay. New York-Chicago fare will be \$19.00 (just under 4 cents a mile), compared with \$27.75 by rail coach and \$41.15 by railroad. The research rate is 15 percent below the basic New York-Chicago tariff of United Air Lines and other carriers on the run.

No more will be served on the non-city pair flights, and only one stream of aircraft at each airport will be carried. One flight might still leave Chicago and New York, between mid-afternoon and 2 a.m.

► **Family Plan Reports**—Miscellaneous CAB fare research reports on American Airlines to submit special reports on the progress of the carrier's

family excursion lines which was authorized on Sept. 15 and set to expire Dec. 31 unless extended. The Board said it is in the public interest for American to show as soon as possible the effect of the family fares on its financial and operating conditions.

As a consequence, for each month starting with October, AA will have 30 days in which to give CAB information on (A) the number of family groups participating under the family plan; (B) the number of passengers traveling at half fare under the plan; (C) total passenger miles flown under the plan; and (D) the number of family group programs involving under the plan. American will also furnish estimates of passenger miles traveled by family groups.



MILLION DOLLAR FACT

Transported Air Lines, Oklahoma, Col, has signed a \$1,000,000 contract to build the Air Line, Tulsa, Oklahoma, with plans, crew and terminal personnel. The agreement calls for delivery of ten DC-7s and two DC-8s. Boeing is donating one to the Air Line. TWA will assist in training the Tulsa center's flight and ground personnel. A newly formed subsidiary of Inland Air Service, Dallas, Tex., has been operating six DC-3s under Pan Am's lease. One DC-4 is being delivered by Transcon. A Berlin 100 percent passenger load factors flying Nantona on their second flight to New York. Transcon recently started PA-12 inducts from Knoxville to Chicago via Bushong, Chicago to Singapore via Colombo and Bangkok, and Kuala Lumpur via Hong Kong using the PA-12. Transcon agreement on Boston-Miami, PA-12, Harris, Bell, and Col. Ken Edwards, TWA, Dallas, Tex., is being studied. Meeting in Deep Sea Johnson, Transcon's vice president in charge of air.

single rates traveled by days of the week for periods prior to provision of the family fares so that CAB will have a basis for analyzing the effect of the plan on traffic and revenues.

► **Northwest, TWA Participants**—Consistent with its order that American make special reports, CAB authorized TWA and Northwest Airlines to submit family fare starting last week. Like American's tariffs, these provide that an adult paying full fare can take with him at half fare one or two of his immediate family if they fly on Monday, Tuesday or Wednesday, when traffic is normally light.

Northwest Airlines had a family fare plan in effect since Sept. 23. Two Florida—Providence Airlines and South West Airways—started to offer family fares starting this week, and Eastern Airlines is to follow suit next week.

► **Complaints Filed**—Delta Air Lines has complained strongly against National's proposed family fare plan, saying the NAL had failed to state in its tariffs package CAB's assumptions as to the industry serving in Washington, Aug. 15. Pointing to its own 2 to 10 percent basic fare hike made effective Dec. 15, Delta contends the move shows NAL placed it at a competitive disadvantage with respect to pass of points served by both Delta and National.

The parent NAL is further indignant that because competitive points through the family plan would further improve air positions and result in losses. Delta declared it added that it National would increase its fares in proportion to the increases authorized by Delta there would be an objection to the family plan.

Eastern Air Lines has complained to CAB against Florida Airways' proposed family fare plan, which would be only one fixed carrier that would not see a rise and would apply to two or more non-city points. It sought the same time, but changed that Florida "in perhaps the most highly subsidized air carrier in the U.S." and an institution of the proposed rates would make the carrier even more dependent on the government. CAB's protection plan (see side story) and national travel.

► **Group Travel Abuse**—United Air Lines has had problems in calling "group abuse" fares proposed by TWA and other carriers which permit parties to buy or more persons flying from the same point of origin to the same destination to ride at a 20 percent discount. UAL declared the fares were uncompetitive with rail and other modes. The fares were proposed by the group travel proposal is open to abuse about "Ticket brokers avoid low group tickets, but instead of buying them for a

party could purchase them to sell one by one to individual customers. If they tried to operate at all, they apparently could obtain refunds but their customers would still travel at reduced rates. Swagers might purchase group tickets and, irrespective of the legality of the act, might pass on only part of the discount to customers, pocketing the rest."

Northeast May Get More Mail Pay

Northeast airlines' financial position could change most of the past season has taken a worried turn for the better with a CAB order to grant higher mail rates and pay over cost last week.

Representatives of five carriers last week said the possibility that even higher government mail rates will be set for the coming budgetary process for 1947. The five carriers will cost \$2,000,000. Fast delivery is scheduled for January.

► **Selected Income**—CAB's new three-year mail contract with NEA \$1,000,000 as mail pay (up to 45 cents a piece) will be for the 14-month period between May 2, 1947, and June 30, 1949. This is \$10,100 more than the carrier received under its old rate.

Northeast would also get 40 cents a piece (old mail pay for the period starting July 1, 1946). Under this rate, the carrier should receive about \$100,000 a year more than under the previous formula.

► **88 in Red**—The new temporary mail rates will not use Northeast as the benchmark for the period extending back to May 1, 1947, and will not make provision for the future. The carrier had said it needed 15 cents a piece (old rate) to break even for the year ended Aug. 30, 1946, and 24 cents a piece thereafter.

The carrier will not see a rise in its mail rate, NEA last \$1,464,716 in the 14 months prior to Feb. 1, 1947. The proposed adjustment will reduce that deficit to around \$195,000. Northeast would get a \$370,575 profit in August under the old rate, and these earnings will be increased substantially by the new formula.

New Bermuda Service

New England has been given a great deal of concern with Bermuda in the result of a CAB decision granting Pan American Airways a link between Boston and the most isolated Colonial Airline, which commenced its service via Continental Air Lines, plus two land, one Pan Am Lines and Trans-World Airlines.



AIRLINE TELEVISION

Watching a "test" in commercial air transportation today, Capital Airlines has made television broadcasts available to passengers on its weekly flights between Washington

and Chicago. The carrier is cooperating with the Public City, installed the first sets in time by the World News Extension of service is contemplated.

Feeder Poll Shows Public Support

Pioneer surveys two representative cities, finds opinions favor federal subsidies and airport aid.

Feederline transportation with six eyes on the last-upcoming operations days of their temporary existence can find encouragement in a public opinion poll conducted recently in two Texas communities.

The survey, made by the University of Texas' Bureau of Business Research, shows wide public support for government subsidy of local carriers and federal and municipal aid to support such facilities. It also indicates that a large majority of the people in the two cities believe feederlines contribute importantly to the U.S. air power program which can be done up or out of national emergency.

► **Opinion Types**—San Angelo and Temple, Tex., were selected for the pioneer opinion survey because they represent two communities in types of cities served by local carriers, according to J. W. Marston, as stated professor of transportation at the University of Texas, who directed the study. San Angelo, with 60,000 population, has generally poor rail and no local bus connections with other points with which it has a community of interest. But it has exceptionally good main-line rail service via Continental Air Lines, plus two land, one Pan Am Lines and Trans-World Airlines.

Temple, by contrast, has excellent highway and rail connections with other Texas points. Much of the population is continuously dependent on the railroads, and Pan Am, the only certified airline operating through Temple, provides service on two bus routes.

► **All Groups Poll**—The study, which includes air carriers and local government, was undertaken at the suggestion of Pioneer, which has asked CAB for a permanent certificate to replace its temporary license. Survey data may be used by the state of Texas and municipalities to support PAA's case.

Approximately 75 percent of all people polled in San Angelo said 15 percent in Temple were aware that the federal government supported the local carrier through mail pay. Among this group, 75 percent were informed groups, 81 percent approved of the general policy in San Angelo and 85.2 percent in Temple.

Of 660 people in San Angelo who expressed opinions regarding use of mail pay to support the feederline, 96.8 or 54 percent said local service is vital and mail pay should be based on the amount required to keep the feederline operating. Thirty-three (5 percent) thought feeder service is needed but added that mail pay should be cut back on some local other than mail use of the airline could not keep operating under the setup. No one among

the 166 persons polled in San Angelo (all local services were not needed and 173 (41 percent) had no opinion on the subject.

► **Railroad Travel**—Is the railroad travel in Temple really more convenient than it is elsewhere? Of 706 persons answering the question about general rail and air support for the local airport, 287 (72 percent) said the service is necessary and would rates should be set high enough to assure its operation. Twenty-two (13.3 percent) said the service as needed but would pay compensation should be set on terms other than those now exist at all means the various part of business. Two persons (less than 1 percent) said better service are not needed and should be discontinued, while 57 (21.9 percent) had no opinion.

Asked whether they considered further airline development as valuable in an increasing share of air power which can be drawn on as a source of national emergency, 493 San Angelo residents (67.6 percent of the 734 polled) said yes. Twenty-five (3.4 percent) said no, 78 (10.6 percent) indicated they were afraid to Temple 90 persons (21.7 percent of those answering) give the same reply. Other reasons given also are reflected therein.

In San Angelo, 501 persons (49.7 percent) said they had no reason for going to transportation, and in Temple the percentage was 76.6 percent. Expense was cited as a reason by 19.5 per-

cent in San Angelo, by 5.7 percent in Temple preference for bus or train by 2.3 percent in San Angelo, by 33.2 percent in Temple and 16.6 percent in San Angelo, by 12 percent in Temple, as indicated by 8.8 percent in San Angelo, by 3 percent in Temple, and 1.4 percent in Temple. The remaining 47 percent of those polled in San Angelo, by 3.5 percent in Temple and 5.5 percent in Temple.

► **Annual Cost**—Average person in San Angelo area and covered 38.5 years of service during 1947 (771 years for the average family), while in Temple the average person is 39 years per person and 49.9 per family last year. In San Angelo, 172 of 721 families (23.8 percent) had no automobile in 1947, and the same was true for 300 of 375 families in Temple.

Presumably that percent paid rates would be 136 percent of surface rates (actually they are 480-680 percent of surface rates), 21.5 percent of the families in San Angelo said they would use the new service, 17.4 percent said they would not and 41.1 percent were undecided. They would only 35.6 percent of the families were sure they would use an aircraft part at the suggested rate level, 74.1 percent said they would not and 10.9 percent were undecided.

In San Angelo, 61 persons among those polled said they would use an airplane (simple or expensive) at some time last year against 399 who had not. In Temple 28 persons said an airplane would use the service last year, 39 percent in San Angelo and 46.3 percent in Temple obtained to use it more in 1948; while 28.5 percent and 24.1 percent, respectively, indicated they would use an airplane last year. Over 14 percent in San Angelo and 8 percent in Temple used an airplane last year.

► **Airport Aid**—More than 71 percent of San Angelo residents familiar with the present program of municipal contributions toward the support of airports said by the action favored construction of an airport. The response was true of 91.8 percent of the surveyed persons in Temple, but 83.5 percent of all persons polled in San Angelo and 90.7 percent in Temple were undecided with their reply to the question.

Daily 16.9 percent of the people in San Angelo and 9.5 percent in Temple were acquainted with the federal aid to municipal airport program. Of the surveyed group, 36 percent in San Angelo and 94.8 percent in Temple approved of the construction.

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SHORTLINES

► **Air France**—WAL inaugurates 22½-hour Coast-to-Coast service from New York to Rome this week.

► **Alaska Airlines**—Has been offered \$100,000 (75 cents a plane mile) as temporary mail pay for service during 1947 and 90 cents a plane mile as after Jan. 1, 1948.

► **Assessment**—Board of directors has declared the rights quarterly dividend of \$71 cents a share in the corporation's \$1.50 convertible convertible preferred stock.

► **Capital**—Reported as \$55,653 opening up \$600 in September, making the 1947 record for surface rates. Net profit as September was \$54,071, and the owner's cash balance reached \$5,795,236—highest year, October, 1946.

► **Company** will be by its chairman, D.C. with University of Michigan graduate student from Detroit to Minneapolis for the University of Minnesota. Received grant and a D.C. head of University of North Carolina from John R. Baker, D.C. to Kansas, Texas, to the University of Tennessee.

► **China National Aviation Corp.**—Has arranged to lease Pacific service out of San Francisco from two flights a month to New York.

► **Hawaiian Airlines**—CAB has denied the owner's petition for further hearing in the international route case to arrive in place of disapproval of Hawaiian from Inter-Island Steam Navigation Co.

► **Inspection and Nationalization Service**—The Justice Department agency is receiving reports but for an inspection of alien deposits (mostly from western points to El Paso, Tex.) through June 10. Satisfactory results of other will come by an hour report U. S. cities in San Francisco, Seattle, New York, and Miami under contract.

► **Northwest**—is working on a year-ended pilot employment program whereby the pilots take their vacation in the local winter season. Company has lost all between 90 and 60 employees, more of whom will be retained until the new season in Hawaii is inaugurated. NWA's first way here between Seattle and Anchorage, Alaska, was not from 12:30 to 8:52 effective Oct. 13. The few times will remain until next spring.

► **Pan American**—CAB has approved PAA's acquisition of capital of Air France from Mexico. First service on Pan American's new route between the Pacific Northwest and Hawaii will prob-

ably be on a once weekly basis with DC-6's. C-46s based from the Air Force recently carried 100,000 lb of textile piece goods from Illinois to Hawaii.

CAB SCHEDULE

Nov. 1—Prohibiting preference in an exact schedule now (Union 101 at 10).

Nov. 1—Holding rotating conference in western transportation case now (Union 101 at 10).

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The 3-minute Wily Glow flare burns brightly in darkness for 300-500 yards, smoke-free. Flare of any weight, suitable for re-chargeable containers.

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PAA OPENS NEW SHOPS AT MIAMI

Fin American Airways' new Miami terminal building at the world's largest airline headquarters facility—has been placed in operation. Last time the world's largest airport terminal building at the former Miami Air Depot, began before morning through the plant on a main pedestrian walk. Photo shows part of the main concourse overhead building at Miami International Airport. Engines and a PAA DC-7, DC-4s, Convair 440s, and Convair 440s are visible. The Convair 440 DC-7s and their engines will continue to be used at Pan American's International, Inc. maintenance shops.

Persuading Millions to Fly II

Most of aviation's toughest business problems today would be solved if we could get millions more to fly.

Fear probably remains an important reason more of the public reserves voluntarily grounded, although statistics showing you are probably safer in an airplane than in your own home are gradually penetrating through the conservatism of public opinion.

But this fear, although strong enough to deter many a flight, is still only a thin veneer that could be softened by a little effort on the part of industrial aviation.

Further, the public's lack of knowledge about the advantages and the ease of making reservations is fully as strong a deterrent as fear.

Because most of us in the business take the advantage of flight for granted, because we use the airplane at every opportunity, we too often forget that millions have never even had the opportunity to stroll onto an airplane at an airport, sit in the seat, marvel at all those safety gadgets, ogle the stewardess and look out the windows at those lag engines and the impressive speed of a wing.

This is kindergarten stuff, maybe, but aviation isn't going to grow at maximum speed until we give more people a chance to do these simple things and let them get acquainted with airplanes in this way. It's a pretty short step from the toes of a plane sitting on the ground to a cheer for a little, short flight—maybe just ten minutes—but it's the most important step that permits will ever make at an air industry is concerned. By some experience seems to prevent flight most people are converted to air travel by their first comfortable flight.

And once you convert a citizen to flight, you are another step toward winning his interest as a traveler or as a customer or improving his local airport, terminal building, and other air aids. And he'll have a more personal interest in supporting an adequate Air Force, too.

With all this in mind, we seized on a story sent the other day by Aviation Week's correspondent in Providence. We think it reports one of the most valuable "air shows" that aviation business could imagine. No blood-curdling sky stunts by dare devil pilots, no fleshy gyrations at three thousand feet to make the spectator think how lucky he is to be safe on the ground!

This is the story, and see how it tells commercial aviation:

Providence—More than 50,000 persons visited the

Theodore Francis Green Airport at Hillgrove, R. I., on Columbus Day to attend an Open House program sponsored by the State Department of Public Works.

Four airlines—American, Eastern, United and North-east—took part in the display show, along with United Aircraft Corp., General Electric, and other manufacturers of aviation equipment.

Biggest surprise of the day was the success of Associated Airlines' offer of a 30-minute sightseeing trip around Rhode Island for \$1.50. The company had only one DC-3 available for the flights. Nine trips were made, giving 100 persons a chance to fly.

But hundreds went home disappointed. Wilcox C. Harr, American manager at Providence, said that he could have kept those DC-4 planes busy all day, so popular were the rides.

Eastern provided a Cessna for the show, starting the program with a courtesy flight for the state and civic officials, led by the governor. Later the plane was placed on exhibition, along with two cargo planes and a DC-6 furnished by American.

CAA's DC-3 equipped with control landing gear also gave demonstrations during the day, along with the quiet Stearman and Piper Cub, modified to become "good neighbor" by the Aeronautical Research Foundation at Harvard University.

Exhibits in the hangar were provided by Rhode Island industries that use air flights, air express and passenger services to promote their business.

Aim of the show was to show the visitor how their airport operates and why improvements are needed to speed the use of air services vital to help local industries meet competition.

Gov. John Feltus said that the greatest credit he's optimistic about the prospect of approval for a \$1,000,000 bond issue for airport improvements on Elizabeth Ave. Money is needed to extend 400-ft. runway to 5000-ft., provide a new terminal and an improved lighting system for the field.

We congratulate those who sponsored and participated in the show. Aviation safety, comfort and reliability can be demonstrated as easily as Herb Hoover Barry thrill possibilities. Give the public an opportunity to get acquainted, first hand, with airplanes, and millions more will fly.

ROBERT H. WOOD

Picture of a Sky-Giant's Heartbeats



...the Sperry Engine Analyzer

in engine performance. Blood-thin checks, gyro-like pointers on the analyzer scope spot in location and nature of error, previously enough to indicate one spark plug from among the Navigator's 224 at the Coast Patrol's 144.

At Arriving at his destination, the Flight Engineer can give the ground crew a specific list of maintenance items, many times eliminating hours of trial-and-error trouble-shooting.

Minimizing up to 60% of delays caused by power plant troubles.

The Flight Engineer uses the Engine Analyzer to keep his eye on the operations of his engines — continuously monitoring any irregularities.

This reduction in maintenance time will make possible regular flight schedules, less over-all passenger travel time.

Sperry's Engine Analyzer is the first complete instrument provided in commercial aircraft to analyze diesel engine vibrations. Now in full production for airlines use, the Engine Analyzer takes its place beside the many other Sperry products designed to aid commercial aviation.

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Major Percy raced to England with Wellington's report of the victory at Waterloo. But the King had already received the news from Nathan Rothschild, whose private courier had brought the word the day before. This advance information paid the House of Rothschild handsome dividends on the London Exchange—which was one of the reasons why the Rothschilds maintained the fastest courier service of that day. Today's business finds it

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The Beechcraft twin-engine Executive Transport plane reduces the time wasted in "getting down to business," increases the time devoted to business itself. The comfort and convenience of this nine-place transport take the fatigue out of travel, conserve energy, and step up the efficiency of both executives and personnel. More than 400 U. S. corporations use it to "get there first!"



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